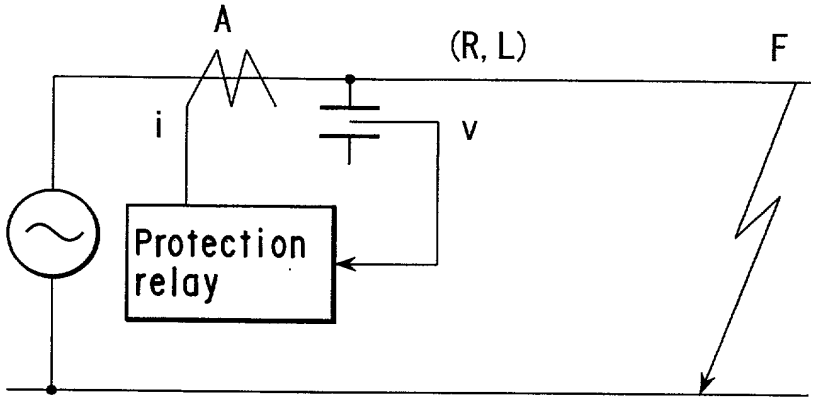

FIG. 1 (PRIOR ART)

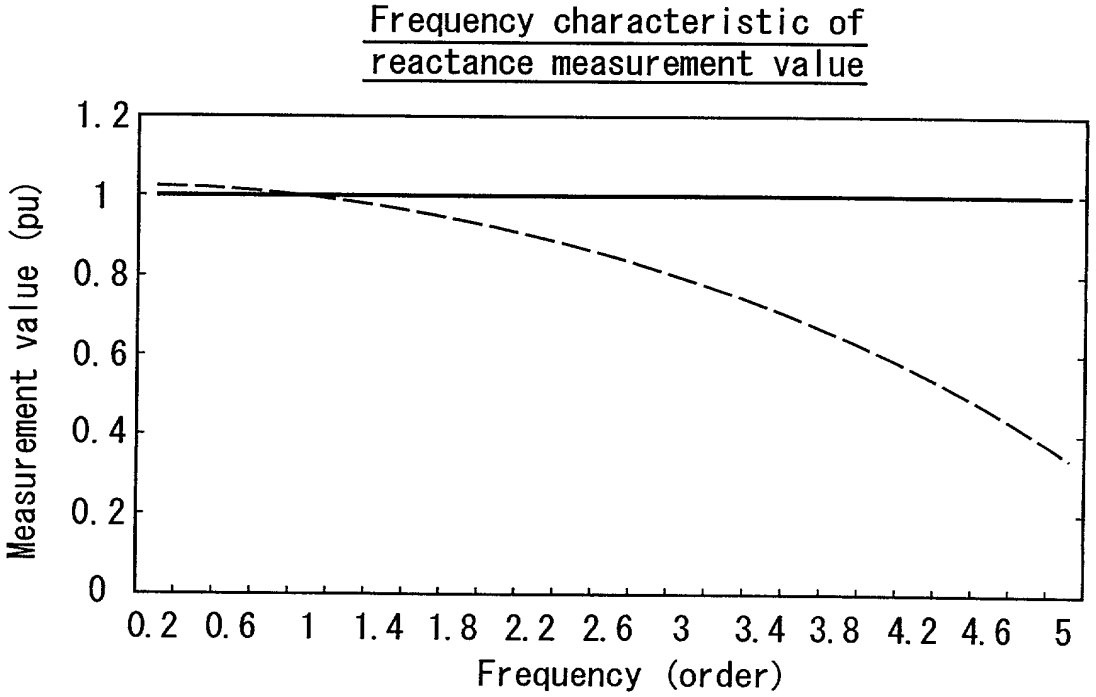

FIG. 2 (PRIOR ART)

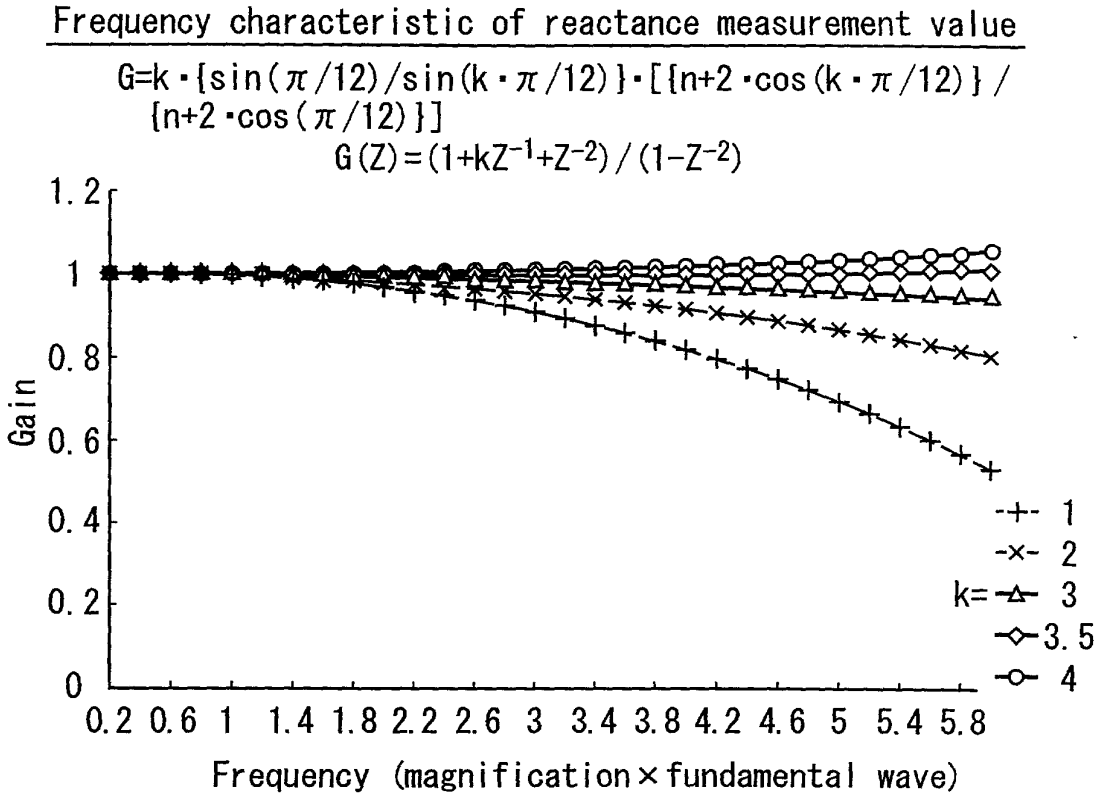
Frequency characteristic of reactance measurement value
G=k・{sin(π/12)/sin(k・π/12)}・[{n+2・cos(k・π/12)}/{n+2・cos(π/12)}]
G(Z)=(1+kZ⁻¹+Z⁻²)/(1−Z⁻²)
Gain
1.2
1
0.8
0.6
0.4
0.2
0
0.2 0.6 1 1.4 1.8 2.2 2.6 3 3.4 3.8 4.2 4.6 5 5.4 5.8
Frequency (magnification×fundamental wave)
k= 1
2
3
3.5
4

FIG. 3

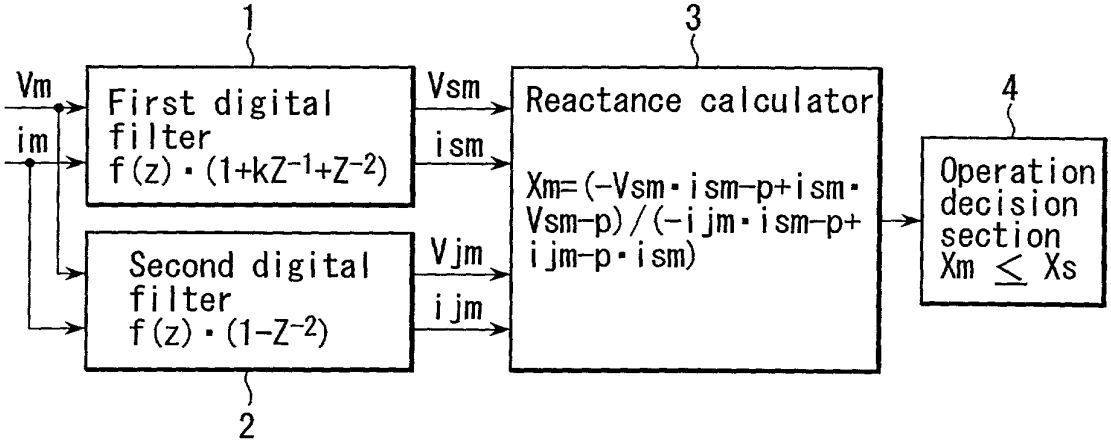
1
3
4
Vm
im
First digital filter f(z)・(1+kZ⁻¹+Z⁻²)
Second digital filter f(z)・(1−Z⁻²)
2
Vsm
ism
Vjm
ijm
Reactance calculator
Xm=(−Vsm・ism−p+ism・Vsm−p)/(−ijm・ism−p+ijm−p・ism)
Operation decision section Xm ≦ Xs

FIG. 4

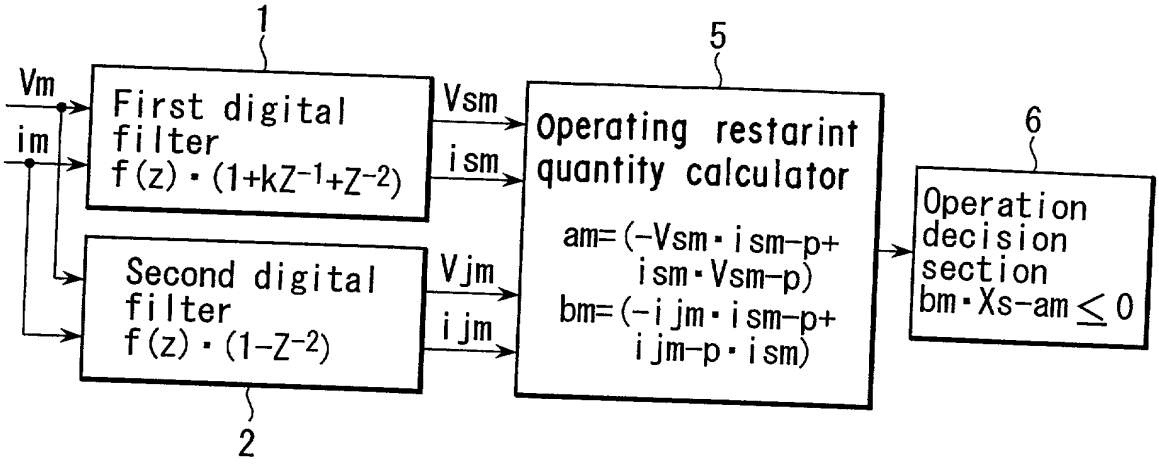

FIG. 5

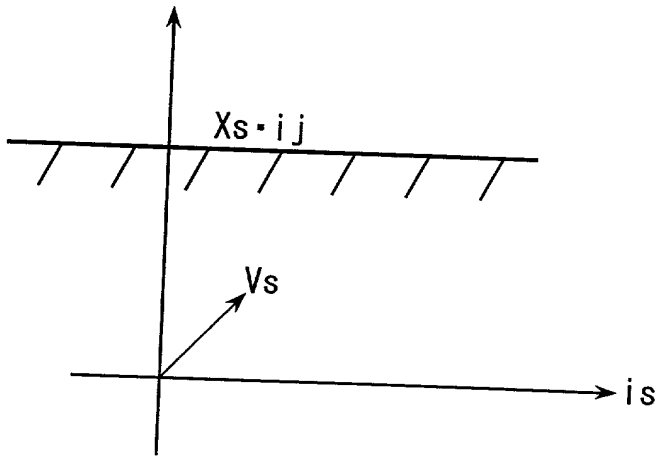

FIG. 6

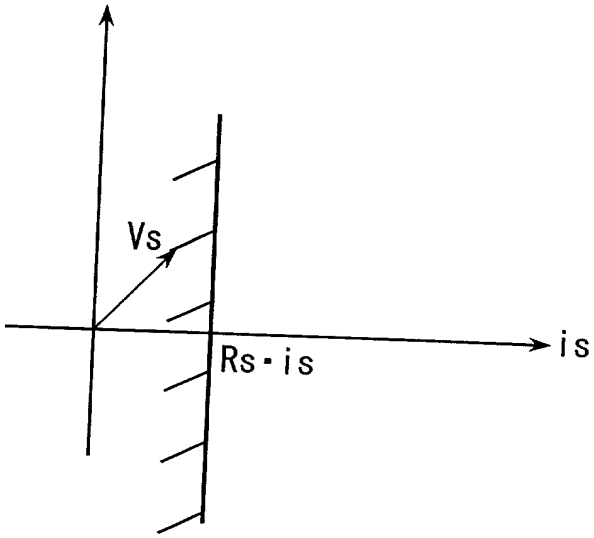

FIG. 9

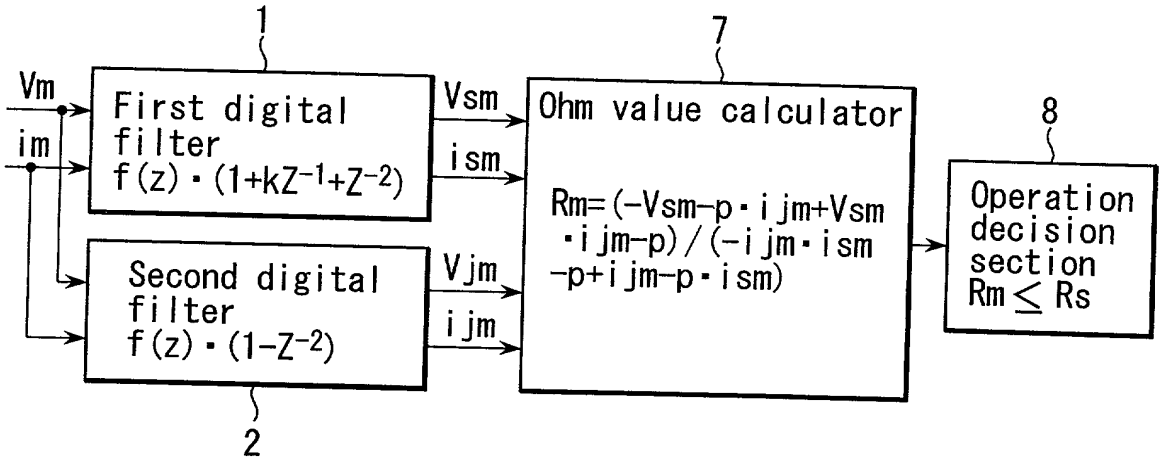
1
7
8
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Ohm value calculator
Rm=(-Vsm-p・ijm+Vsm・ijm-p)/(-ijm・ism-p+ijm-p・ism)
Operation decision section
Rm≦Rs

FIG. 7

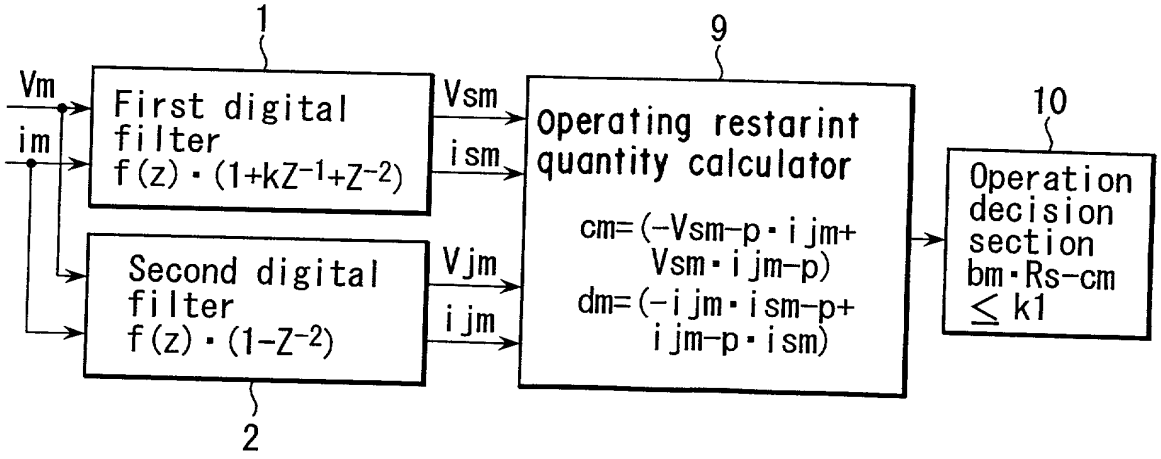
1
9
10
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Operating restarint quantity calculator
cm=(-Vsm-p・ijm+Vsm・ijm-p)
dm=(-ijm・ism-p+ijm-p・ism)
Operation decision section
bm・Rs-cm≦k1

FIG. 8

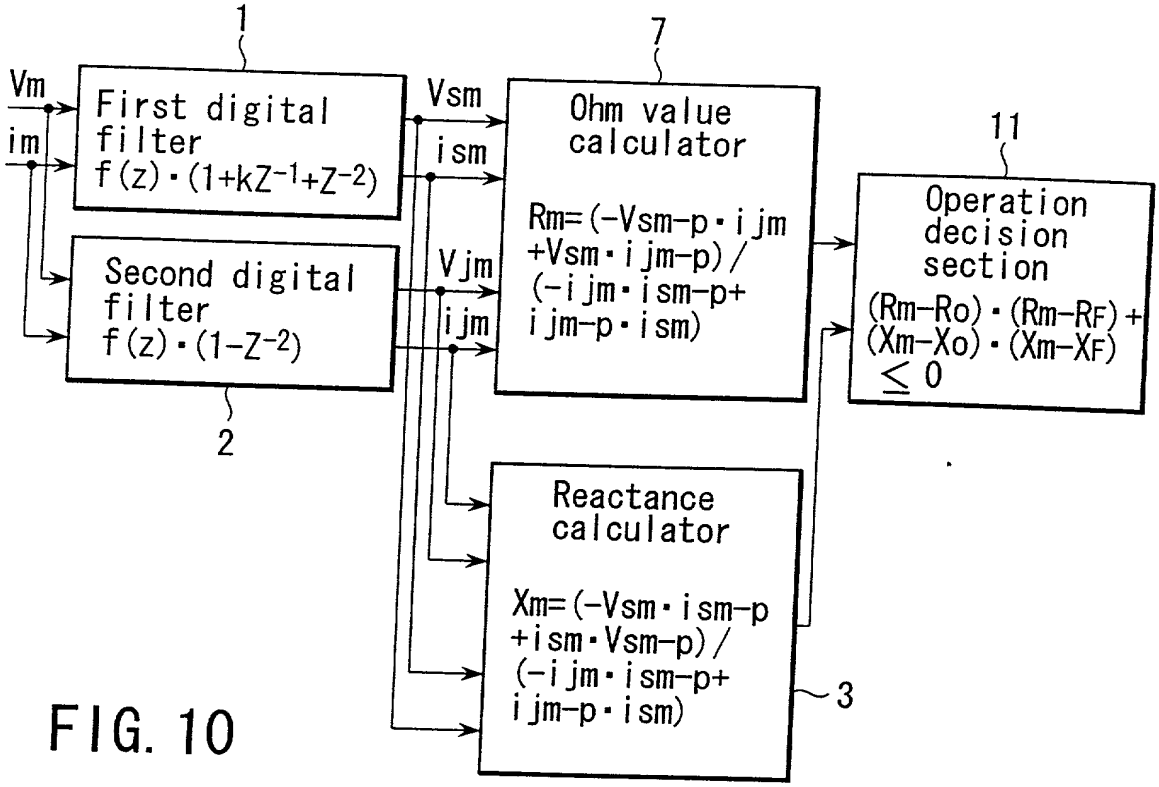
1
7
11
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Ohm value calculator
Rm=(-Vsm-p・ijm+Vsm・ijm-p)/(-ijm・ism-p+ijm-p・ism)
Operation decision section
(Rm-Ro)・(Rm-RF)+(Xm-Xo)・(Xm-XF) ≤ 0
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Reactance calculator
Xm=(-Vsm・ism-p+ism・Vsm-p)/(-ijm・ism-p+ijm-p・ism)
3

FIG. 10

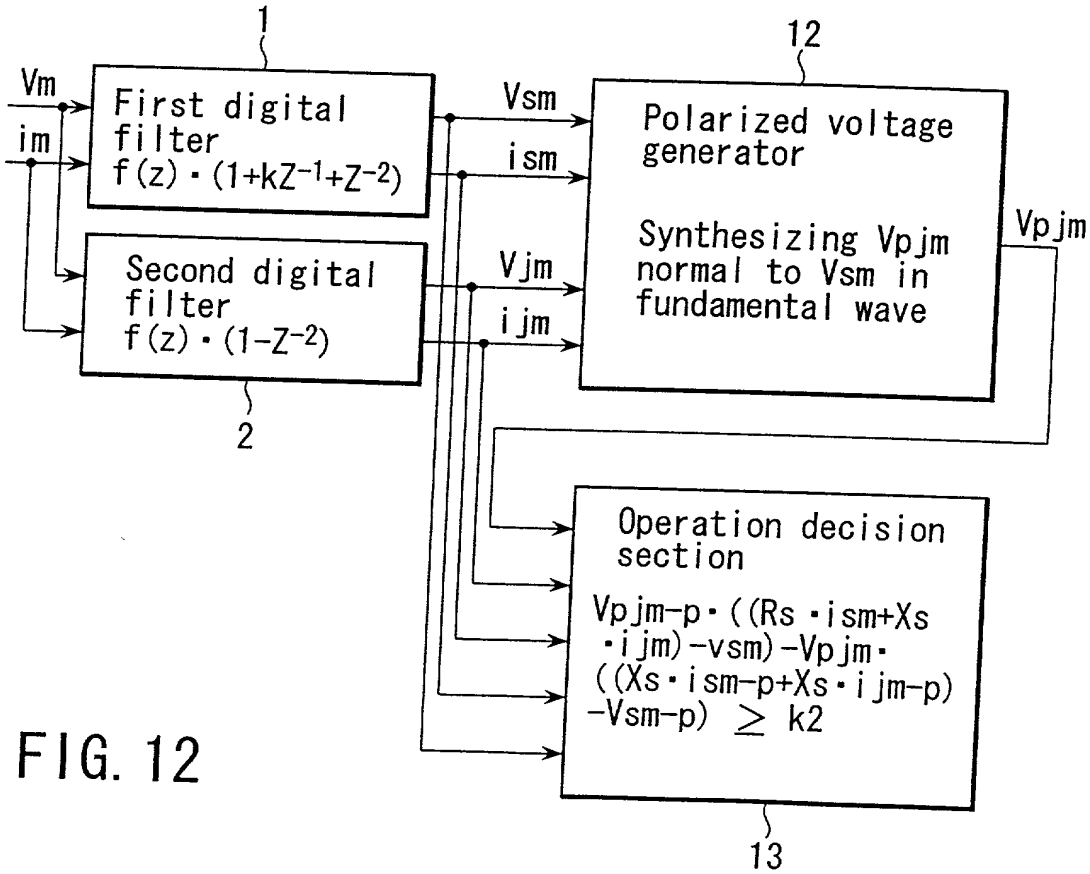
1
12
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Polarized voltage generator
Synthesizing Vpjm normal to Vsm in fundamental wave
Vpjm
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Operation decision section
Vpjm-p・((Rs・ism+Xs・ijm)-vsm)-Vpjm・((Xs・ism-p+Xs・ijm-p)-Vsm-p) ≥ k2
13

FIG. 12

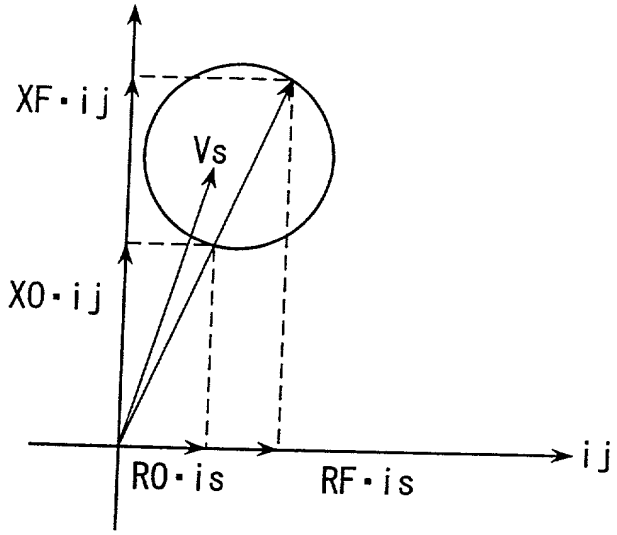

FIG. 11

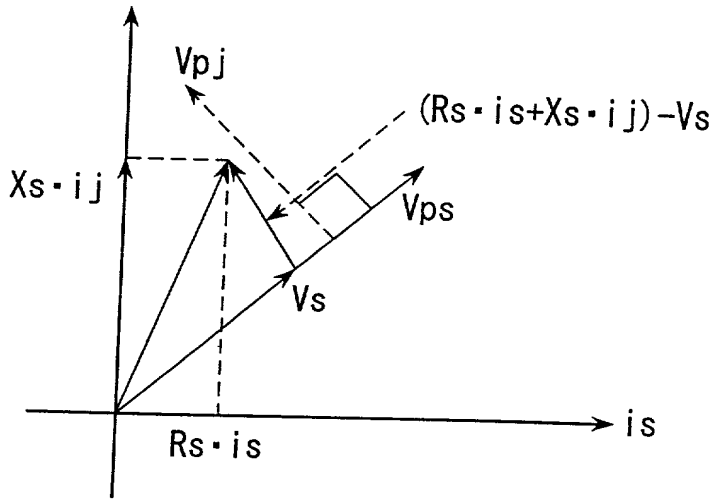

FIG. 13

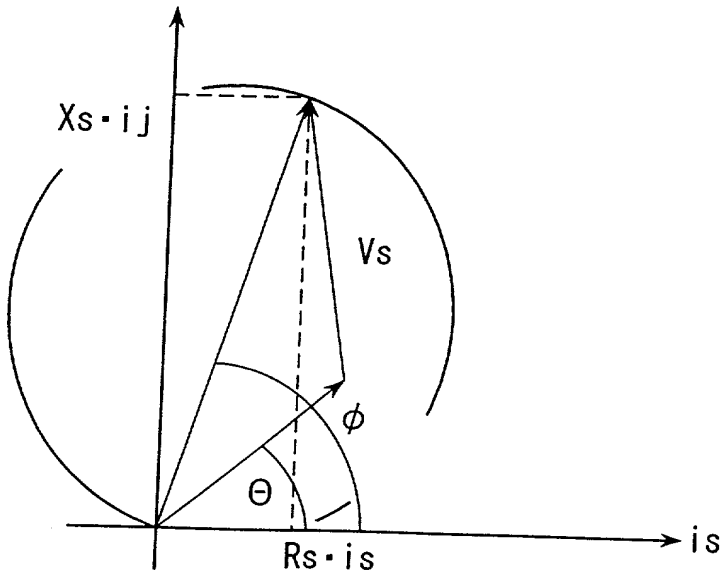

FIG. 14

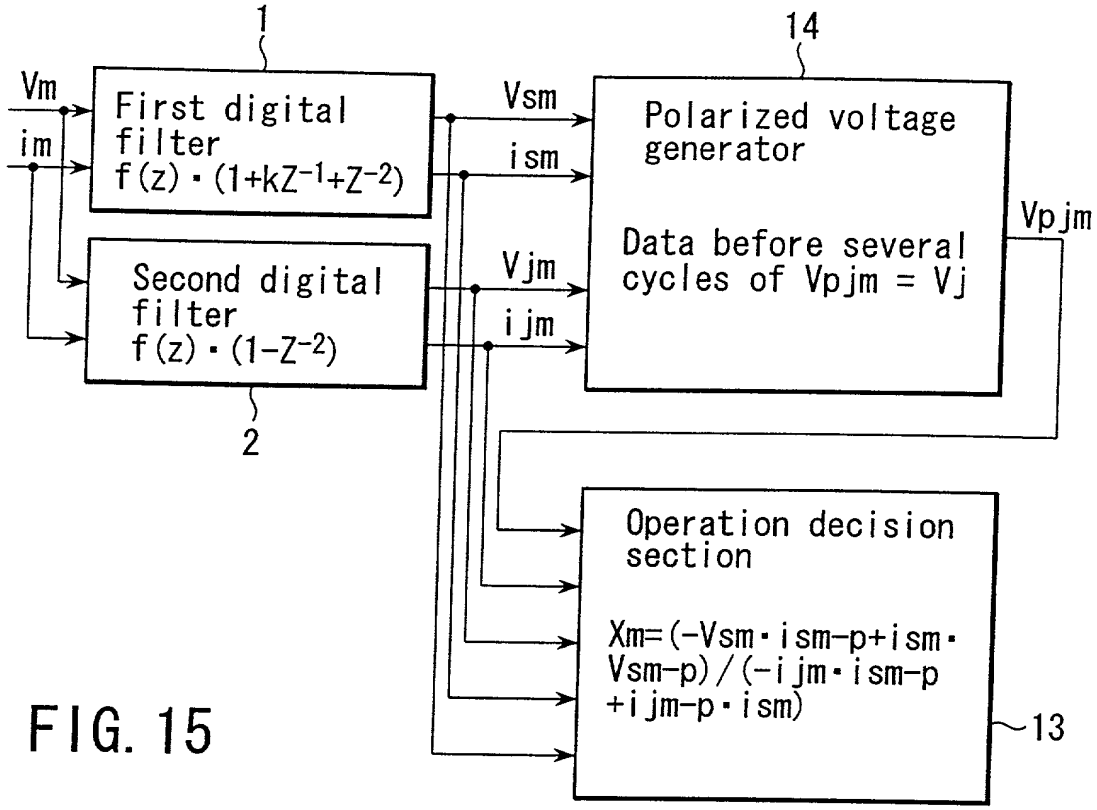
1
14
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Polarized voltage generator
Data before several cycles of Vpjm = Vj
Vpjm
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Operation decision section
Xm=(-Vsm・ism-p+ism・Vsm-p)/(-ijm・ism-p+ijm-p・ism)
13

FIG. 15

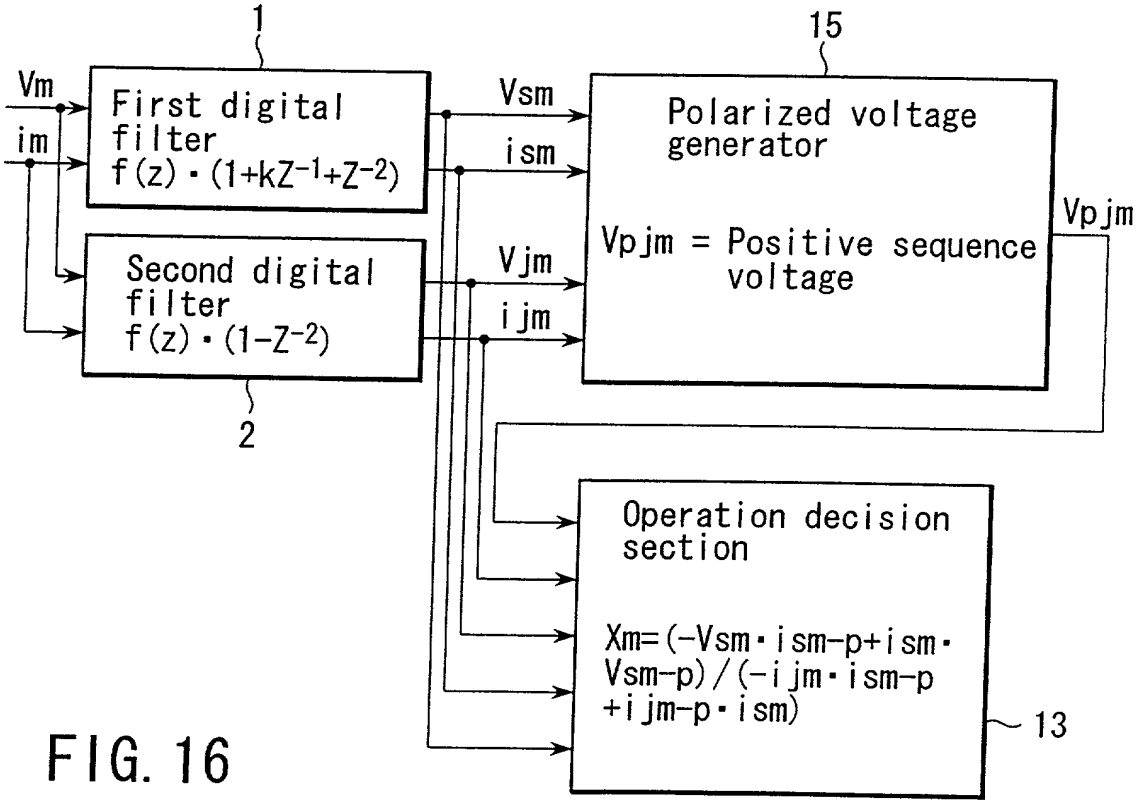
1
15
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
Vsm
ism
Polarized voltage generator
Vpjm = Positive sequence voltage
Vpjm
Second digital filter
f(z)・(1-Z-2)
Vjm
ijm
2
Operation decision section
Xm=(-Vsm・ism-p+ism・Vsm-p)/(-ijm・ism-p+ijm-p・ism)
13

FIG. 16

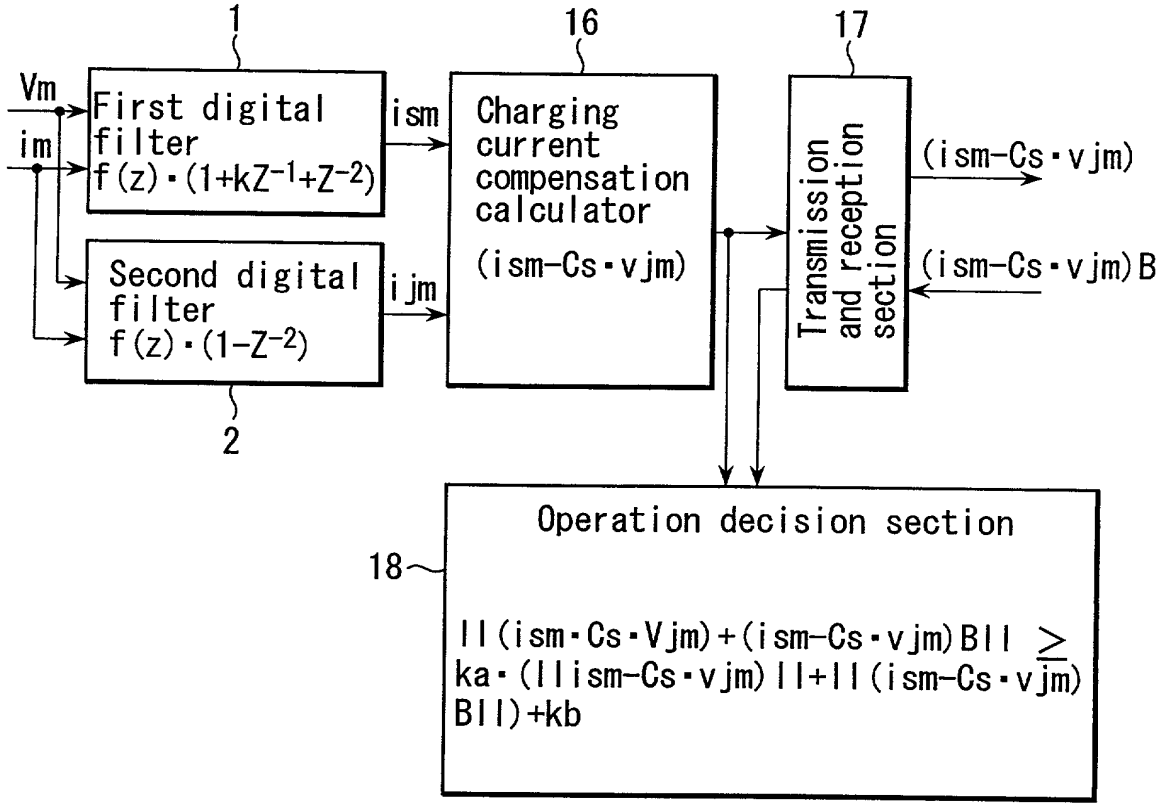
1
16
17
Vm
im
First digital filter
f(z)・(1+kZ-1+Z-2)
ism
Charging current compensation calculator
(ism-Cs・vjm)
Transmission and reception section
(ism-Cs・vjm)
(ism-Cs・vjm)B
Second digital filter
f(z)・(1-Z-2)
ijm
2
Operation decision section
18
||(ism・Cs・Vjm)+(ism-Cs・vjm)B|| ≧ ka・(||ism-Cs・vjm)||+||(ism-Cs・vjm)B||)+kb

FIG. 17

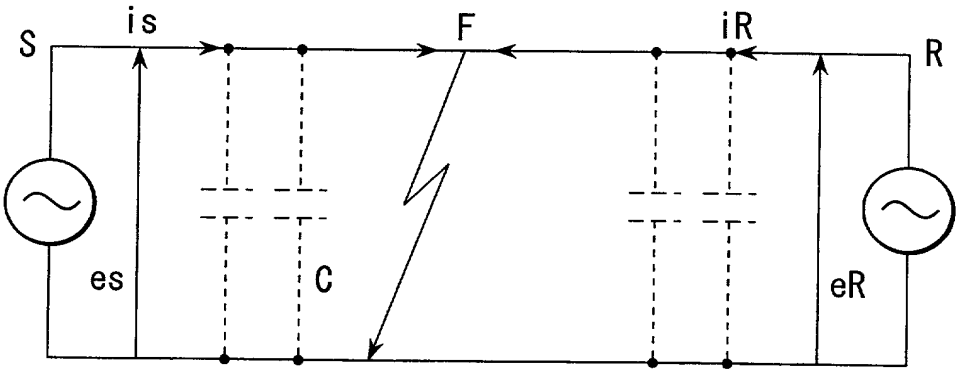
S
is
F
iR
R
es
C
eR

FIG. 18